



## **Science, Technology and Telecommunications Committee**

Richard A. Márquez, Executive Director

November 3, 2015



# Work at Los Alamos is organized under five principal associate directorates (PADS)

Mission Focus

**Global Security**

**Weapons Programs**

**Science,  
Technology, and  
Engineering**

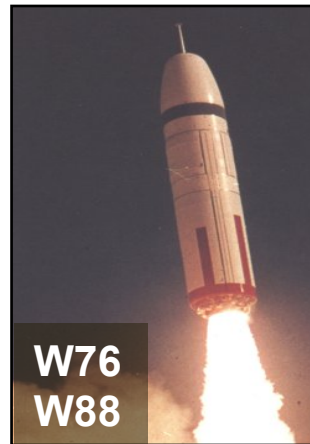
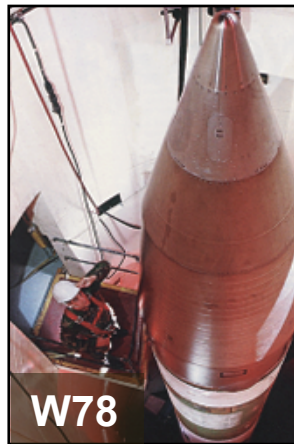
**Operations and Business**

**Capital Projects**

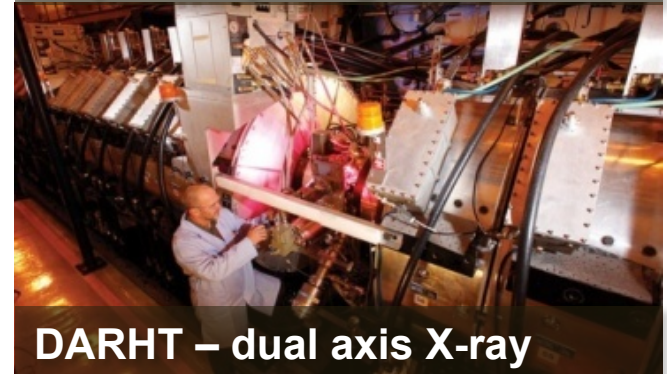
# We are essential to ensuring the U.S. nuclear deterrent

Mission Focus

- Los Alamos helps ensure the safety, security, and effectiveness of the nation's deterrent
- Los Alamos is the design agency for four out of seven warhead systems in the nation's arsenal



Supercomputing



Non-nuclear testing, modeling, simulation, and other tools and capabilities provide assurance

We use science to annually certify to the Secretary of Energy, Secretary of Defense, and the President that the stockpile will perform as intended

# Reduction of threats of WMD and terrorism are critical to our national security

Mission Focus

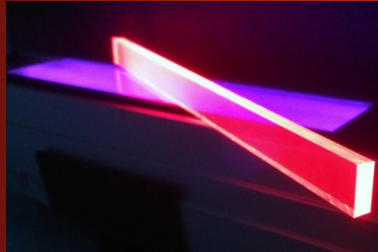


- Reduce proliferation threats
- Safeguard and detect radiological material
- IAEA inspector training
- Counterterrorism
- Critical infrastructure modeling
- Disaster response



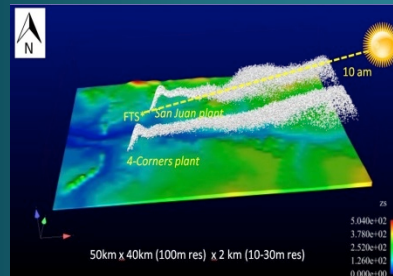
# Long-term investment in science creates lasting payoffs for the United States

Mission Focus



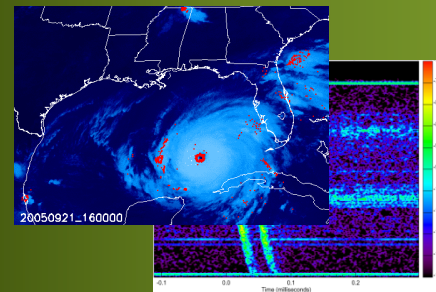
## MATERIALS FOR THE FUTURE

Defects and Interfaces  
Extreme Environments  
Emergent Phenomena



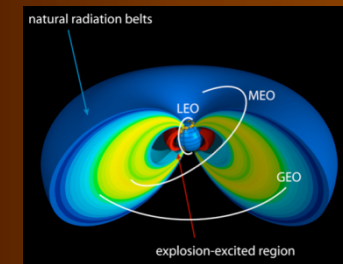
## SCIENCE OF SIGNATURES

Discover Signatures  
Revolutionize Measurements  
Forward Deployment



## INTEGRATING INFORMATION, SCIENCE, AND TECHNOLOGY FOR PREDICTION

Complex Networks  
Computational Co-Design  
Data Science at Scale



## NUCLEAR AND PARTICLE FUTURES

High Energy Density Physics & Fluid Dynamics  
Nuclear & Particle Physics, Astrophysics & Cosmology  
Applied Nuclear Science & Engineering  
Accelerators & Electrodynamics

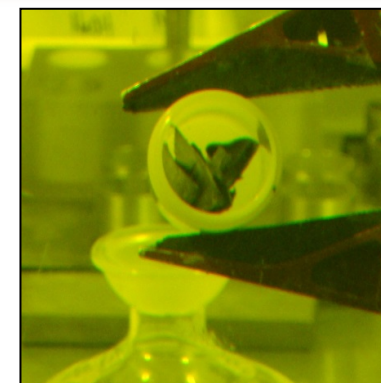
**LANL Science Pillars are a foundation of mission success**

# Medical isotope production at LANSCE is life-saving science

## Science Highlights

- **Los Alamos' Isotope Program produces isotopes when the commercial sector cannot meet the need**

- We are the largest domestic supplier of isotopes for cardiac imaging (~ 30,000 patients per month) and cancer imaging studies (strontium-82 and germanium-68)
- Other isotopes include sodium-22 (PET imaging), arsenic-73 (environmental tracer), silicon-32 (climate modeling); more than 160 shipments have been made this year to medical, industrial, and academic customers
- We are investigating isotopes for cancer therapy including actinium-225 (alpha radiotherapy) antimony-119 (auger electrons) and rhenium-186g (beta therapy)



**DOE's Office of Science funds this important work**

# We are finding new ways to support science, technology, and engineering

## Science Highlights

- The Lab is expanding the machinist pipeline program, the Institutional Technician Program, and the Advancing Women in Engineering initiative
- Through our collaboration with the New Mexico Consortium, we have created two initial Joint Appointments of Los Alamos staff scientists with academic institutions, and seven more appointments are in the works
  - These Joint Appointments provide gateways for university interactions, enhanced research collaborations, and an eventual pipeline for faculty to join the Laboratory



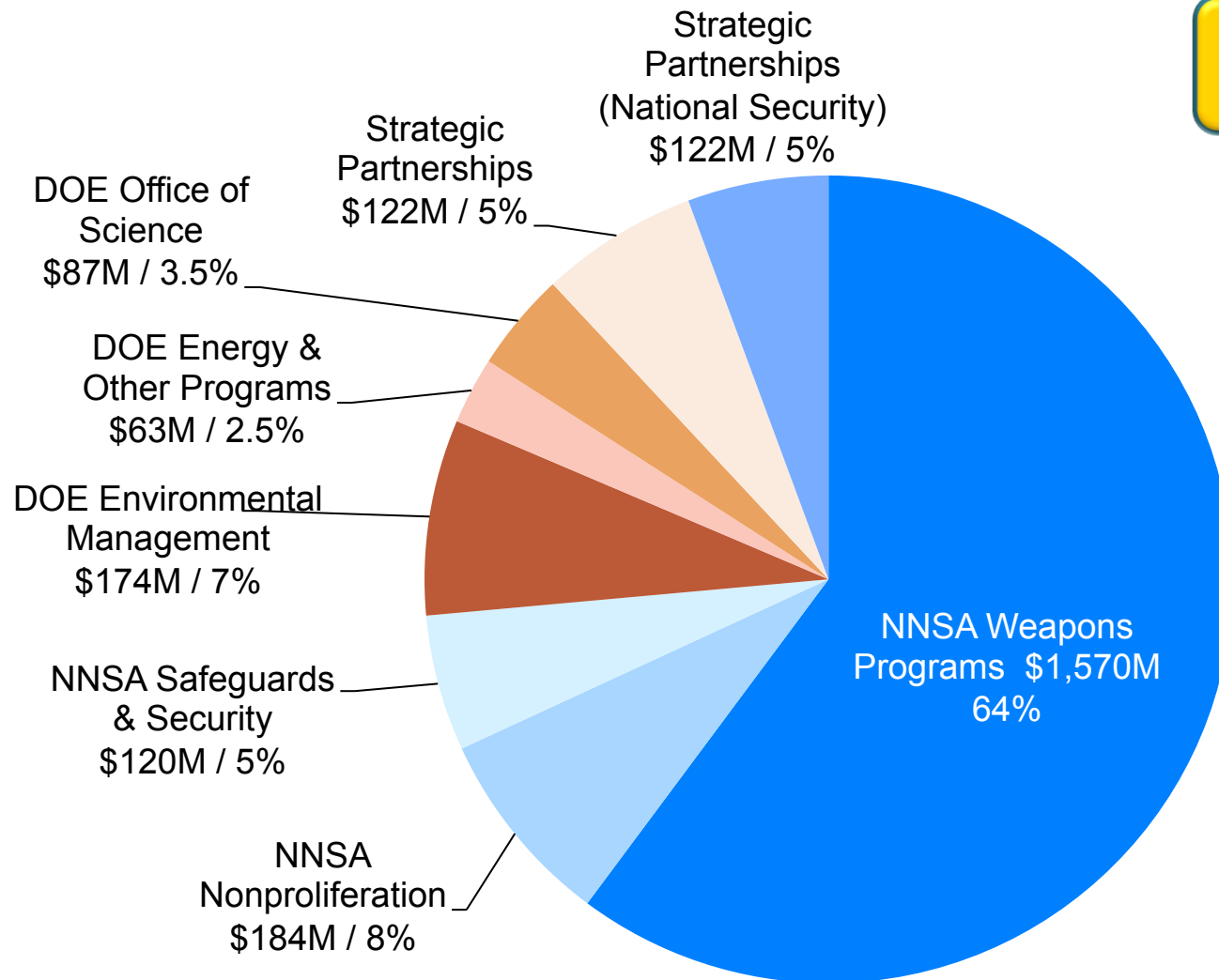
# Our budget remains relatively stable

Fulfilling Our Mission

**FY16 est. LANL Budget  
Authority = \$2.4B**

*FY16 budget has not been  
passed, Continuing  
Resolution has LANL  
operating at FY15 funding  
levels (\$2.15B)*

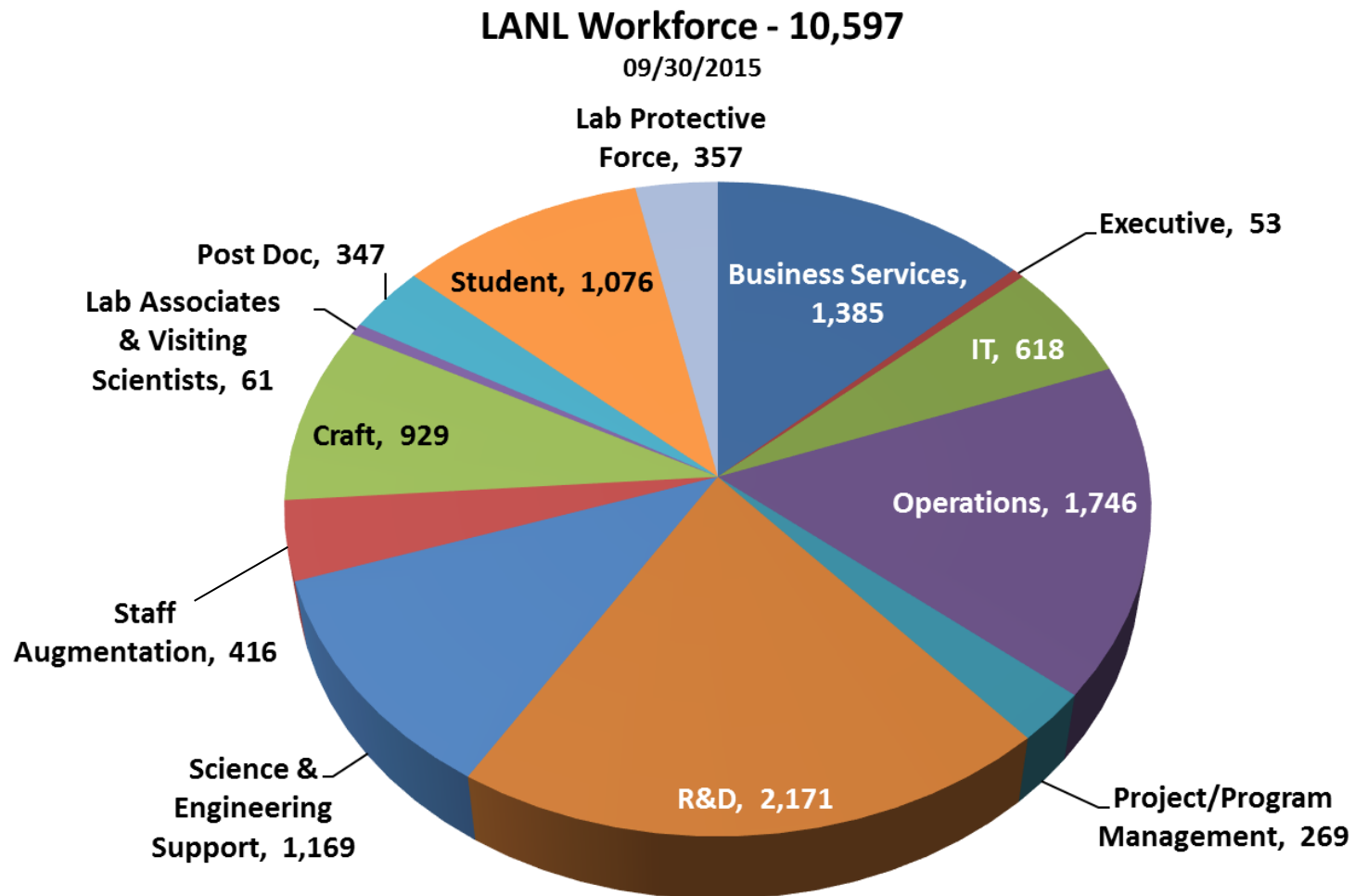
~98% from  
federal  
government  
sponsors  
  
~77% from  
NNSA sponsors





# Our people are our strongest asset

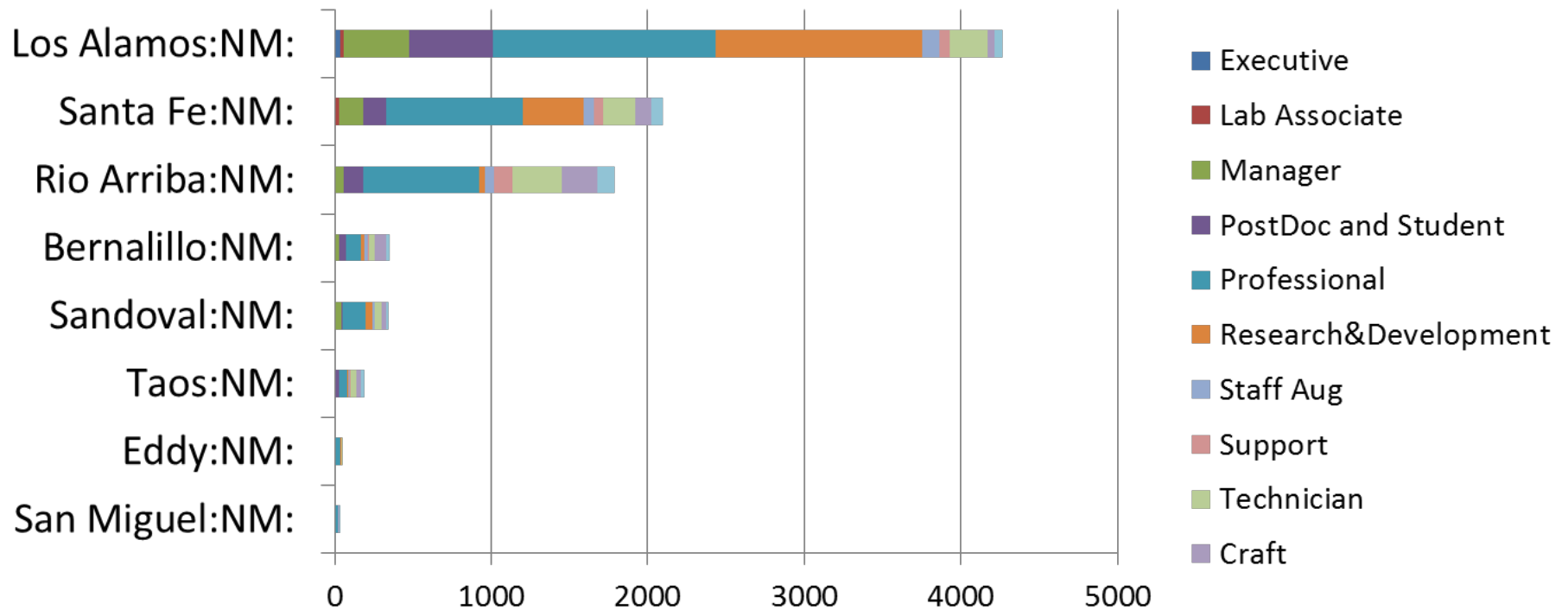
Fulfilling Our Mission



# Our employees have deep roots in Northern New Mexico

Fulfilling Our Mission

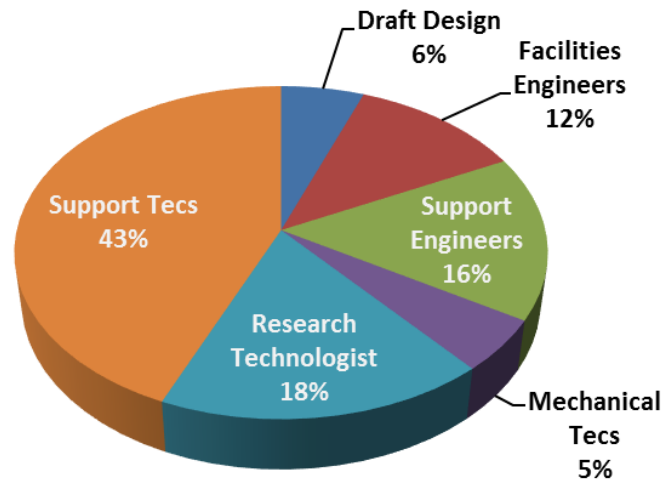
## LANS Employees Top NM Counties



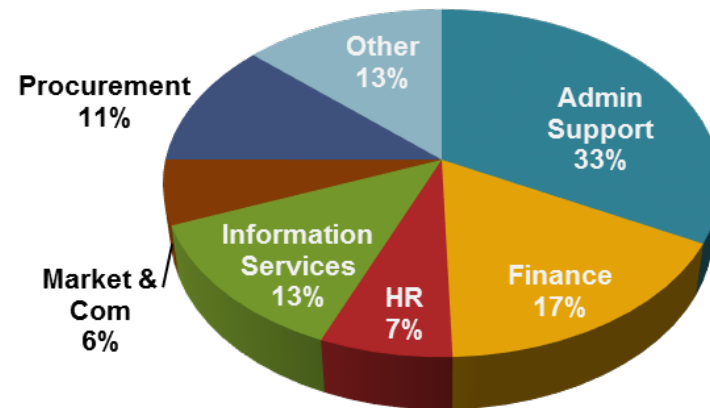
# Los Alamos employs a wide mix of skills

Fulfilling Our Mission

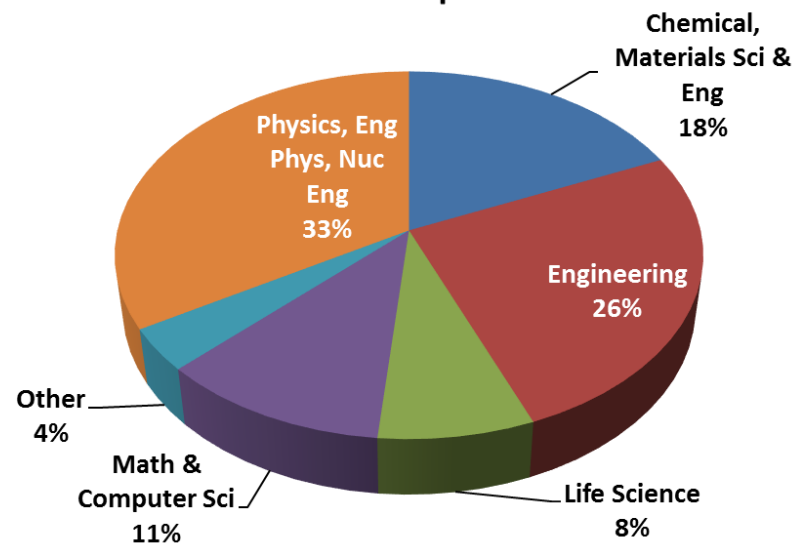
## Science and Engineering Support



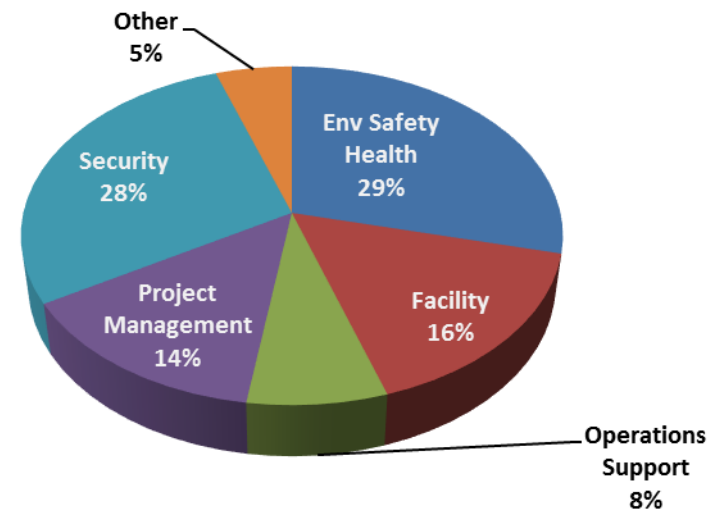
## Business Services



## R&D Disciplines



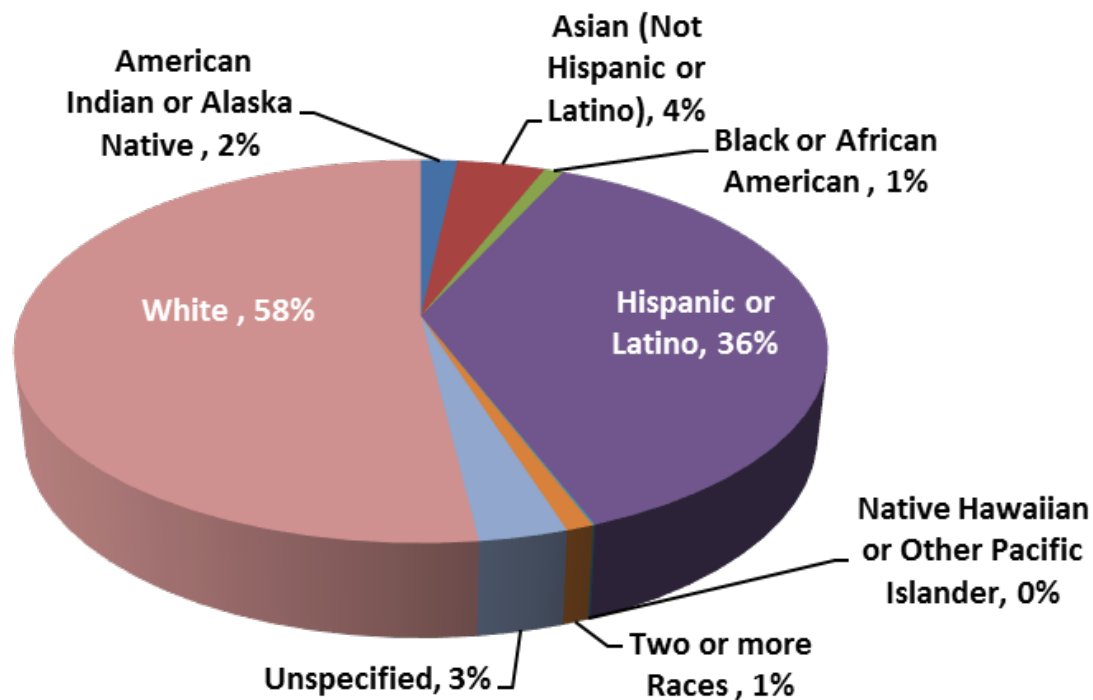
## Operations



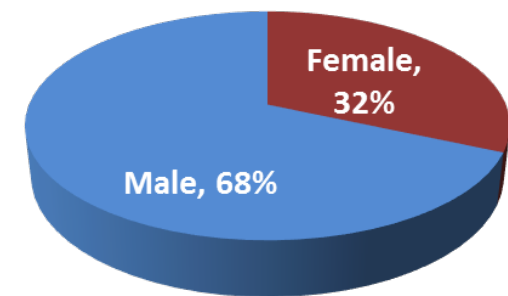
# Diversity is an important component of mission success

Fulfilling Our Mission

## Ethnic Distribution- All LANS Workforce



## Gender Distribution All LANS Workforce





# We have a representative utilization of Hispanic and Native American workers

Fulfilling Our Mission

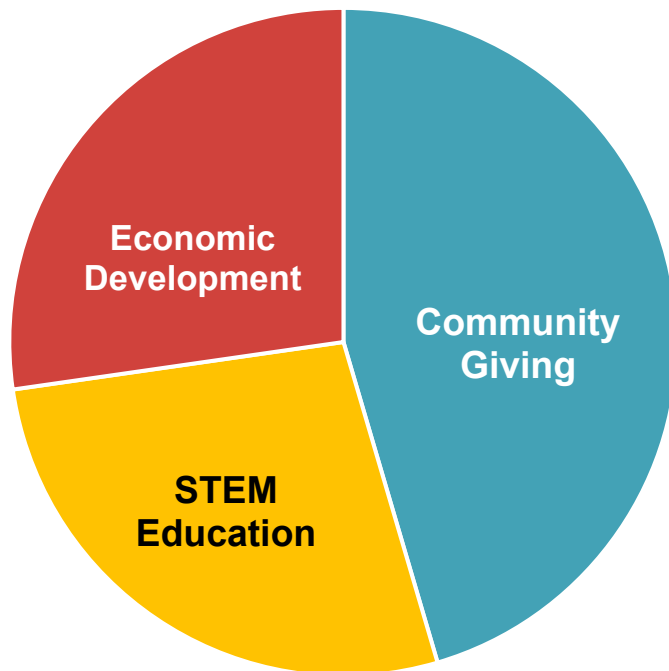
## Utilization of Hispanic and Native Americans by Job Category

Job Category	Hispanic		Native American	
	LANL Utilization	Market Availability	LANL Utilization	Market Availability
Management	23.4%	23.4%	1.0%	1.2%
Professionals	43.9%	45.2%	1.9%	1.6%
Scientists and R&D Engineers	9.5%	9.4%	0.6%	0.5%
Technicians	62.1%	56.4%	2.5%	3.5%
Administrative Support Workers	74.6%	73.6%	3.6%	5.2%

# The Laboratory is an active member of a close-knit regional community

## Community Commitment

### Los Alamos National Laboratory Community Commitment Plan (\$2.5 million)



- Our partner in economic development, the **Regional Development Corp.**, has assisted more than 700 New Mexico companies and entrepreneurs
- Through our partners for community giving—**United Way agencies**—our employees and parent company generate more than \$3 million in regional support
- Through the **Los Alamos National Laboratory Foundation**, more than 1,000 students have received more than \$4.5 million in assistance through the **Los Alamos Employees Scholarship Fund**

# 2015 educational investment creates lasting impacts

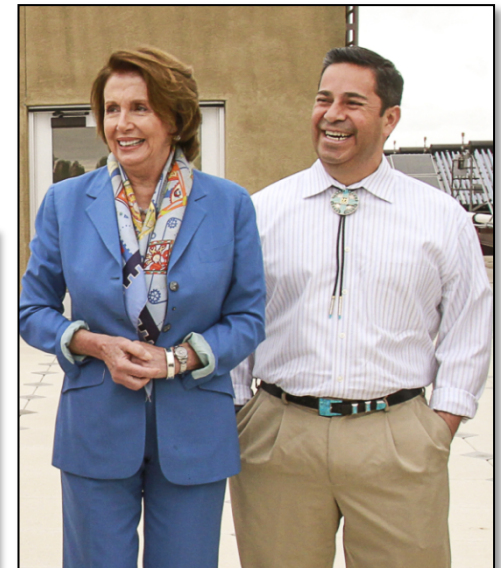
## Community Commitment

### LANS is Lead Donor for Santa Fe Higher Education Center

LANS invested \$100,000 in a new 34,000 square-foot facility which will offer bachelors and master's degree programs from numerous public universities



*DOE Deputy Secretary Elizabeth Sherwood-Randall and Senator Martin Heinrich host an Energy Roundtable at SFCC in July 2015*



*Minority Leader Nancy Pelosi and Congressman Ben Ray Lujan tour SFCC in April 2015*

# 2015 community giving leverages record donations from employees

Community Commitment

- **Employees contribute \$2.2 million to non-profit organizations; LANS contributes \$1 million**
  - Contributions are up from \$2 million the previous year
- **Employees contribute \$256,000 to scholarship fund; LANS matches with \$250,000**
  - Campaign nets highest amount ever contributed by employees
  - More than 1,000 scholarships have been awarded to date
  - 50 percent of scholarship winners seek employment at Laboratory



*Steve Girrens, Associate Director for Engineering and 2015 Champion for Scholarship Campaign*



# Venture Acceleration Fund creates new businesses and jobs

## Community Commitment

- **Funding:**
  - \$3.2 million – LANS, LLC and the Laboratory
  - \$220,000 – Los Alamos County, City of Santa Fe, Santa Fe County, New Mexico Manufacturing Extension Program
- **Highlights:**
  - 53 companies funded from 2006-2015
  - 345 jobs created/retained
- **October 2014:** LANS, LLC and the Regional Development Corporation win Gold Award for Entrepreneurship from International Economic Development Council (IEDC)
- **March 2015:** RDC lands competitive Cluster Grant from U.S. Department of Commerce Economic Development Administration (EDA) to magnify VAF's impact.



Mark Sanchez, Production Manager, FLUTe LLC of Alcalde and 2014 VAF Awardee

*"In order to make this expansion to Alcalde really work, we needed to cut off our dependence on one critical vendor and bring that capability in house," said Mark Sanchez, production manager and equity holder in FLUTe. "We would not have been able to do this without the investment from the Venture Acceleration Fund this year."*

# Investing in entrepreneurship helps build Native American owned businesses

Community Commitment

## Native American Venture Acceleration Fund (VAF)

- Provides financial assistance to tribally owned companies or individual businesses owned by a tribal members for critical technical services

## Impacts

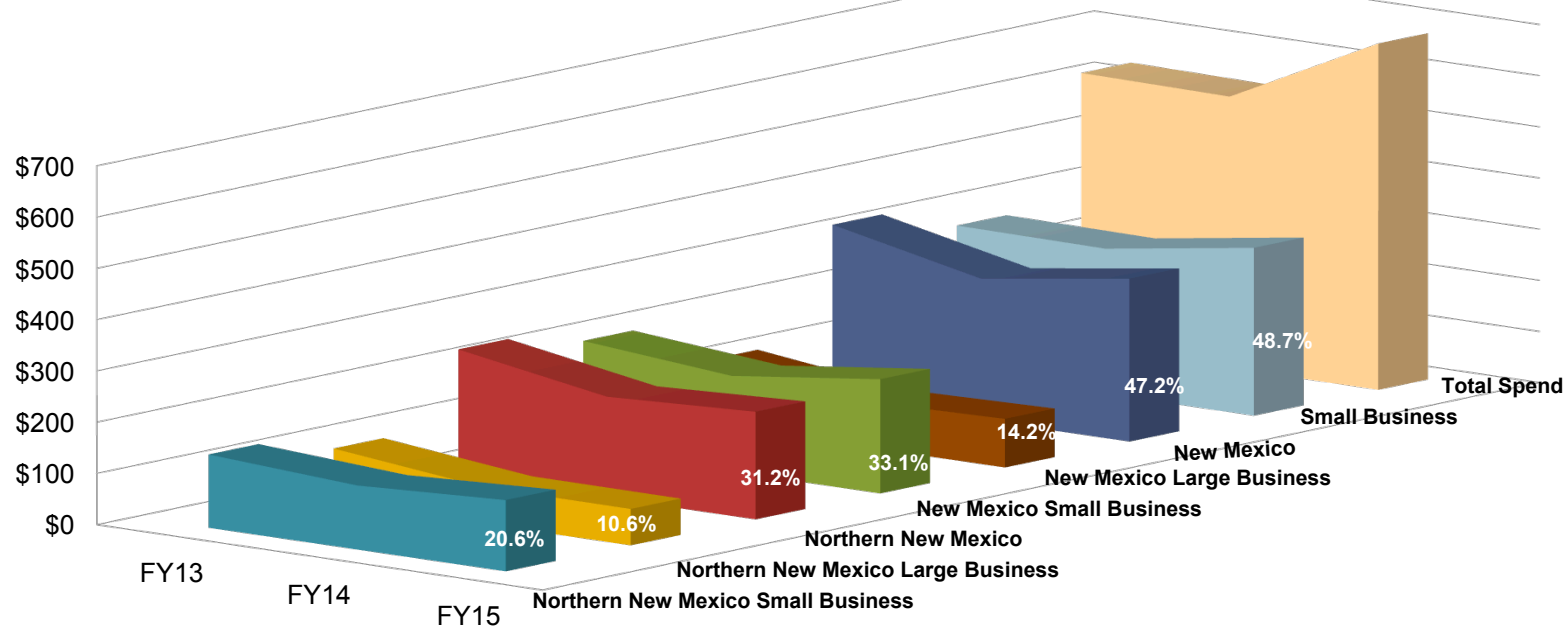
- **\$204,000** to **18** Native American companies in **six** Pueblos
- **22 jobs** created or retained
- **\$700,000** in new revenue has been generated



*Phoebe Suina, Owner-Project Management of High Water Mark, LLC, received a Native American VAF.*

# Los Alamos procurement benefits the state and the region

## Community Commitment



	FY13	FY14	FY15
■ Northern New Mexico Small Business	\$143	\$125	\$139
■ Northern New Mexico Large Business	\$104	\$72	\$71
■ Northern New Mexico	\$247	\$197	\$210
■ New Mexico Small Business	\$213	\$187	\$223
■ New Mexico Large Business	\$125	\$89	\$95
■ New Mexico Spend	\$339	\$276	\$318
■ Total Small Business Spend	\$287	\$284	\$328
■ Total Spend	\$535	\$531	\$677

# Five-year attrition projections provide opportunity to recruit the workforce of the future

## Positioning for the Future

- Based on five-year budget projections and attrition models, about 30 percent of our current workforce will retire or leave by 2020
- The Laboratory's current hiring rate for Los Alamos employees is keeping pace with attrition
- The distribution of worker types at LANL has been fairly stable in recent years—before and after the 2012 Voluntary Separation Program (VSP)



### Current workforce facts:

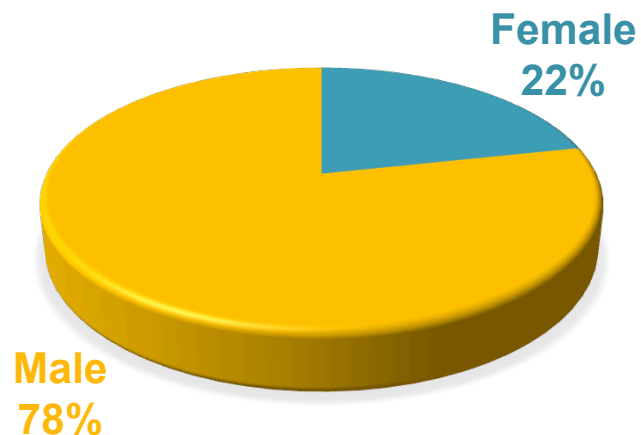
- 41 percent of current Laboratory employees were born in New Mexico
- 33 percent of current degree-holding employees graduated from New Mexico colleges or universities

# Post-Docs and students are a critical ingredient of the workforce of the future

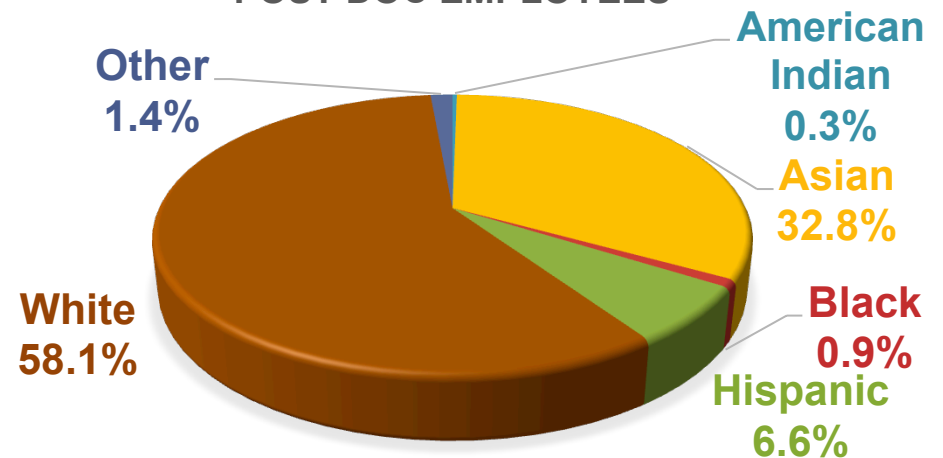
Positioning for the Future

- 347 Post Docs and 1,076 Students are currently employed
- 35% of all current Regular employees were at one time Post Docs or Students
- 58% of all current R&D scientists and engineers were at one time Post Docs or Students

**GENDER DISTRIBUTION**  
POST DOC EMPLOYEES



**ETHNIC DISTRIBUTION**  
POST DOC EMPLOYEES



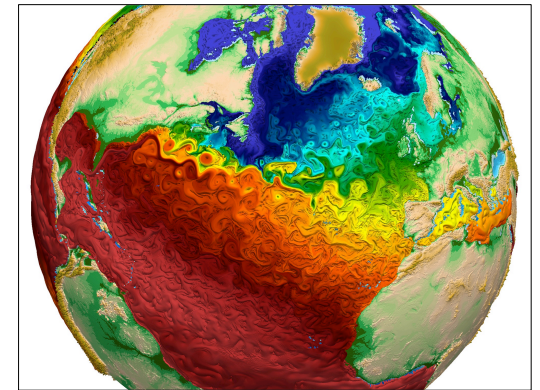


# Los Alamos National Laboratory: a New Mexico institution celebrating a proud past, and anticipating a bold future

- We look forward to 70 more years as the nation's premier national-security science laboratory
- Multidisciplinary science at Los Alamos has maintained our status as an essential component of national and global security
- In order to succeed in our enduring mission, we must successfully recruit and retain our next-generation workforce
- A vibrant region is essential to recruitment, retention, and education—in other words, to the Laboratory's future



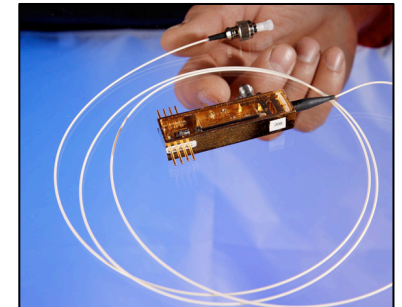
Trinity Test, July 16, 1945



Understanding global climate is a national security pursuit



Emerging technologies create new and difficult national security challenges



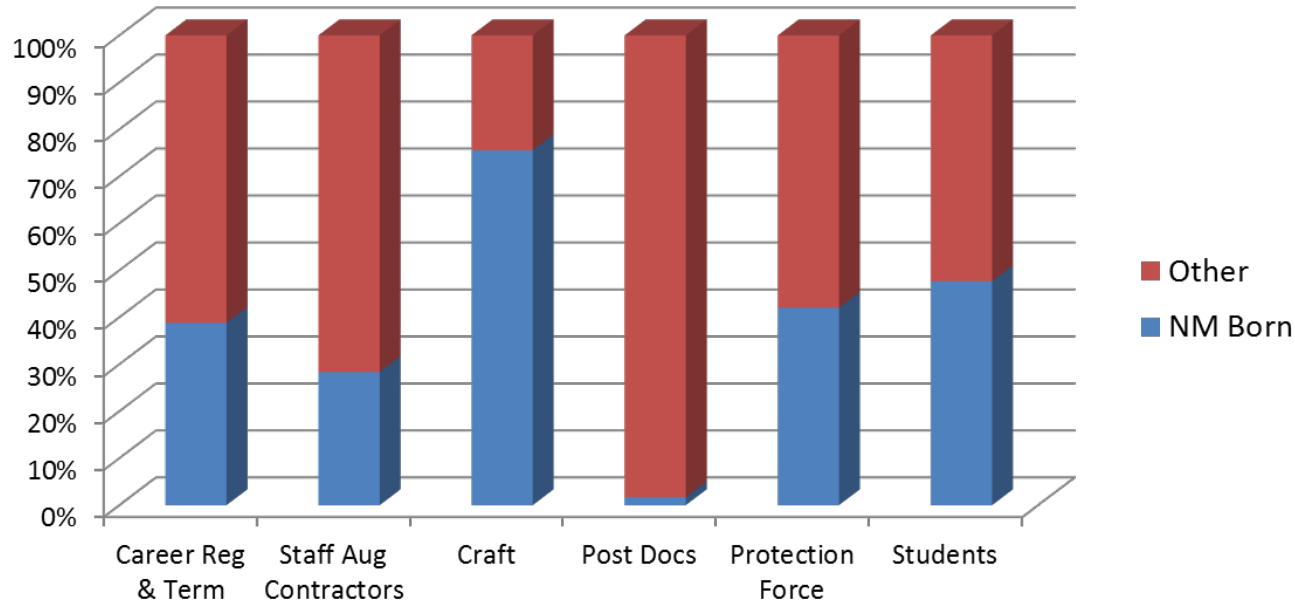
Quantum encryption can help secure the nation's cyber infrastructure



# Backup slides

# Forty one percent of our employees are native New Mexicans

Native New Mexico Employees



Type of Employee	NM Born	Other	Employees	% NM Born
Career (Reg-Term)	2,900	4,572	7,472	39%
Staff Aug Contractors	118	298	416	28%
Craft	702	227	929	76%
Post Docs	6	341	347	2%
Protection Force	150	207	357	42%
Students	513	563	1,076	48%
<b>Total</b>	<b>4,389</b>	<b>6,208</b>	<b>10,597</b>	<b>41%</b>

# The University of New Mexico is well represented among degrees obtained by the Los Alamos workforce

Top Colleges and Universities	Degree Count
<b>Grand Total</b>	<b>13666</b>
University of New Mexico	1441
New Mexico State University	822
Northern New Mexico College	548
College of Santa Fe	373
New Mexico Institute of Mining & Technology	266
New Mexico Highlands University	248
University of Illinois	208
University of Phoenix	208
University of New Mexico Los Alamos	168
Texas A & M University	162
University of Colorado	157
University of Texas Austin	155
Colorado State University	153
University of California Berkeley	143
Massachusetts Institute of Technology	131
University of Arizona	131
University of Wisconsin Madison	125
Colorado School of Mines	122
University of Washington	121
Did Not List	114
University of Michigan	112
Brigham Young University	103
Eastern New Mexico University	90
University of California San Diego	89
Purdue University	85
Other	7391

Top PhD Colleges and Universities	PhD Degrees
<b>Grand Total</b>	<b>2254</b>
University of New Mexico	99
University of Illinois	78
University of Texas Austin	55
University of California Berkeley	53
Massachusetts Institute of Technology	50
Texas A & M University	50
University of Michigan	50
University of Wisconsin Madison	45
University of Washington	43
University of Arizona	42
University of Colorado	42
California Institute of Technology	34
Stanford University	31
Cornell University	30
Princeton University	29
University of California San Diego	29
University of Minnesota	29
New Mexico State University	28
University of California Davis	27
Colorado School of Mines	24
Colorado State University	24
New Mexico Institute of Mining & Technology	22
North Carolina State University	22
Ohio State University	22
Rice University	22
Other	1274

# Los Alamos students and post-docs receive degrees from several New Mexico colleges and universities

Top Colleges and Universities for Students and Post Docs	DPD	GRA	PD	UGS	Total
<b>Grand Total</b>	<b>17</b>	<b>813</b>	<b>887</b>	<b>659</b>	<b>2376</b>
University of New Mexico		93	15	154	262
New Mexico State University		44	3	51	98
New Mexico Institute of Mining & Technology		21	2	38	61
Northern New Mexico College		11		36	47
Colorado School of Mines		17	13	2	32
University of New Mexico Los Alamos		5		25	30
Did Not List	2	3	12	13	30
Texas A&M University		9	15	3	27
University of Michigan		16	9	2	27
Arizona State University		8	8	10	26
University of California Berkeley		13	7	6	26
Brigham Young University		11	4	10	25
University of Washington	1	8	10	4	23
Colorado State University		10	2	9	21
University of Texas Austin		15	4	2	21
Texas A & M University	1	7	11	1	20
University of California San Diego		11	3	6	20
University of Nevada Las Vegas		11	8		19
University of Utah		6	8	5	19
Georgia Institute of Technology		7	7	4	18
North Carolina State University		8	9	1	18
University of Wisconsin Madison		5	11	2	18
University of Arizona	1	2	11	3	17
University of California Davis		8	4	5	17
New Mexico Highlands University		11		5	16
Other	12	453	711	262	1438

## **New Mexico colleges and universities educate our workforce**

### **The Laboratory workforce is significantly populated by New Mexico educated graduates**

- Of the 6,420 employees with degrees, 2,094 (33%) received at least one of their degrees from a NM college or University
- Of the 13,666 degrees earned by LANL employees, 4,024 (29%) came from NM Colleges and Universities
- Of the 2,254 employees with PhDs working at LANL, UNM has the most with 99